Author Index

Ahonen-Jonnarth, U., Van Hees, P. A. W., Lundström, U. S. & Finlay, R. D., Organic acids produced by mycorrhizal *Pinus sylvestris* exposed to elevated aluminium and heavy metal concentrations, 557

Albrechtová, J. (see Soukupová, J.), 403

Amzallag, G. N., Maternal transmission of adaptive modifications in salt-treated *Sorghum bicolor*: a first stage in ecotypic differentiation?, 483

Ashton, N. W., Champagne, C. E. M., Weiler, T. & Verkoczy, L. K., The bryophyte *Physcomitrella patens* replicates extrachromosomal transgenic elements, 391

Bailey, D. J., Otten, W. & Gilligan, C. A., Saprotrophic invasion by the soil-borne fungal plant pathogen *Rhizoctonia solani* and percolation thresholds, 535

Baker, A. J. M. (see Ghaderian, Y. S. M.), 219

——, (see Hutchinson, J. J.), 453

Baum, S. (see Schwarze, F. W. M. R.), 129

Baum, S. F., Tran, P. N. & Silk, W. K., Effects of salinity on xylem structure and water use in growing leaves of sorghum, 119

Bausenwein, U. (see Thornton, B.), 75

Beets, P. (see Laing, W.), 47

Bennett, R. (see Vierheilig, H.), Vierheilig

Bert, V., Macnair, M. R., de Laguerie, P., Saumitou-Laprade, P. & Petit, D., Zinc tolerance and accumulation in metallicolous and nonmetallicolous populations of *Arabidopsis halleri* (Brassicaceae), 225

Black, C. R. (see McKee, I. F.), 427

——, (see Hutchinson, J. J.), 453

Boller, T. (see Mäder, P.), 155

Bortier, K., Ceulemans, R. & de Temmerman, L., Effects of ozone exposure on growth and photosynthesis of beech seedlings (*Fagus sylvatica*), 271

Boyd, R. S. (see Davis, M. A.), 211

Braggins, J. E. (see Chavan, R. R.), 107

Bright, D. I. & Walsby, A. E., The daily integral of growth by *Planktothrix rubescens* calculated from growth rate in culture and irradiance in Lake Zürich, 301

Briske, D. D. (see Monaco, T. A.), 37

Broadmeadow, M. S. J. & Jackson, S. B., Growth responses of *Quercus petraea*, *Fraxinus excelsior* and *Pinus sylvestris* to elevated carbon dioxide, ozone and water supply, 437

Bruhn, D., Leverenz, J. W. & Saxe, H., Effects of tree size and temperature on relative growth rate and its components of *Fagus sylvatica* seedlings exposed to two partial pressures of atmospheric , 415

Brundrett, M. C. (see Chen, Y. L.), 545

Cakmak, I., Tansley Review No. 111: Possible roles of zinc in protecting plant cells from damage by reactive oxygen species, 185

Ceulemans, R. (see Bortier, K.), 271

Chaffey, N., Research review: Physiological anatomy and function of the membranous grass ligule, 5

Champagne, C. E. M. (see Ashton, N. W.), 391

Chavan, R. R., Braggins, J. E. & Harris, P. J., Companion cells in the secondary phloem of Indian dicotyledonous species: a quantitative study, 107

Chavez-Ontiveros, J., Martinez-Espinoza, A. D. & Ruiz-Herrera, J., Double chitin synthetase mutants from the corn smut fungus *Ustilago maydis*, 335

Chen, Y. L., Brundrett, M. C. & Dell, B., Effects of ectomycorrhizas and vesicular–arbuscular mycorrhizas, alone or in competition, on root colonization and growth of *Eucalyptus globulus* and *E. urophylla*, 545

Cherubini, P. (see Tognetti, R.), 59

Christie, P. (see Mäder, P.), 155

Clowes, F. A. L., Pattern in root meristem development in angiosperms, 83

Cochard, H. (see Martre, P.), 235

Craig, J. (see Proe, M. F.), 461

Craigon, J. (see McKee, I. F.), 427

Csiky, O. (see Delfine, S.), 27

Cvikrová, M. (see Soukupová, J.), 403

Davis, M. A. & Boyd, R. S., Dynamics of Ni-based defence and organic defences in the Ni hyperaccumulator, *Streptanthus polygaloides* (Brassicaceae), 211

de Laguerie, P. (see Bert, V.), 225

Delfine, S., Csiky, O., Seufert, G. & Loreto, F., Fumigation with exogenous monoterpenes of a non-isoprenoid-emitting oak (*Quercus suber*): monoterpene acquisition, translocation, and effect on the photosynthetic properties at high temperatures, 27

Dell, B. (see Chen, Y. L.), 545

déLoose, M. (see Hardy, O. J.), 281

de Temmerman, L. (see Bortier, K.), 271

Durand, J.-L. (see Martre, P.), 235

Eaton, R., A breakthrough for wood decay fungi, 3

Eder, J. (see Soukupová, J.), 403

Ernst, W. H. O., Evolution of metal hyperaccumulaton and phytoremediation hype, 357

Fahima, T. (see Peng, J. H.), 141

Finlay, R. D. (see Ahonen-Jonnarth, U.), 557

Fitter, A. (see Wright, W.), 493

Foyer, C. H. & Noctor, G., Tansley Review No. 112. Oxygen processing in photosynthesis: regulation and signalling, 359

Frey, B. (see Mäder, P.), 155

Ghaderian, Y. S. M., Lyon, A. J. E. & Baker, A. J. M., Seedling mortality of metal hyperaccumulator plants resulting from damping off by *Pythium* spp., 219

Gianinazzi, S. (see Salerno, M. I.), 317

Gianinazzi-Pearson, V. (see Salerno, M. I.), 317

Gilligan, C. A. (see Bailey, D. J.), 535

Gorissen, A. & Kuyper, Th. W., Fungal species-specific responses of ectomycorrhizal Scots pine (*Pinus sylvestris*) to elevated , 163

Grama, A. (see Peng, J. H.), 141

Greer, D. (see Laing, W.), 47

Guttenberger, M. (see Wisser, G.), 169

Hampp, R. (see Wisser, G.), 169

Hardy, O. J., Vanderhoeven, S., déLoose, M. & Meerts, P., Ecological, morphological and allozymic differentiation between diploid and tetraploid knapweeds (*Centaurea jacea*) from a contact zone in the Belgian Ardennes, 281

Harris, P. J. (see Chavan, R. R.), 107

Hartzendorf, T. (see Rolletschek, H.), 95

Hatcher, P. E. & Paul, N. D., Beetle grazing reduces natural infection of *Rumex obtusifolius* by fungal pathogens, 325

Heersche, I. (see Van Rijn, C. P. E.), 471

Hutchinson, J. J., Young, S. D., McGrath, S. P., West, H. M., Black, C. R. & Baker, A. J. M., Determining uptake of 'non-labile' soil cadmium by *Thlaspi caerulescens* using isotopic dilution techniques, 453

Innes, J. L. (see Tognetti, R.), 59

Jackson, S. B. (see Broadmeadow, M. S. J.), 437

Kaldorf, M. (see Vierheilig, H.), Vierheilig

Kiddle, G. (see Vierheilig, H.), Vierheilig

Kuyper, Th. W. (see Gorissen, A.), 163

Lagudah, E. S. (see Seah, S.), 527

Laing, W., Greer, D., Sun, O., Beets, P., Lowe, A. & Payn, T., Physiological impacts of Mg deficiency in *Pinus radiata*: growth and photosynthesis, 47

Lambers, H. (see Van Rijn, C. P. E.), 471

Leverenz, J. W. (see Bruhn, D.), 415

Li, Y. C. (see Peng, J. H.), 141

Lindblad, P. (see Paulsrud, P.), 291

Lodge, D. J., Ecto- or arbuscular mycorrhizas – which are best?, 353

Long, S. P. (see McKee, I. F.), 427

Loreto, F. (see Delfine, S.), 27

Lowe, A. (see Laing, W.), 47

Ludwig-Müller, J. (see Vierheilig, H.), Vierheilig
Lundström, U. S. (see Ahonen-Jonnarth, U.), 557
Lyon, A. J. E. (see Ghaderian, Y. S. M.), 219
McKenzie, B. M. (see Singh, D. K.), 249
Macnair, M. R. (see Bert, V.), 225
Mäder, P., Vierheilig, H., Streitwolf-Engel, R., Boller, T., Frey, B., Christie, P. & Wiemken, A., Transport of ^{15}N from a soil compartment separated by a polytetrafluoroethylene membrane to plant roots via the hyphae of arbuscular mycorrhizal fungi, 155
Marchant, R. & Taylor, D., Pollen representivity of montane forest taxa in south-west Uganda, 515
Martinez-Espinoza, A. D. (see Chavez-Ontiveros, J.), 335
Martre, P., Durand, J.-L. & Cochard, H., Changes in axial hydraulic conductivity along elongation leaf blades in relation to xylem maturation in tall fescue, 235
McGrath, S. P. (see Hutchinson, J. J.), 453
McKee, I. F., Mulholland, B. J., Craigon, J., Black, C. R. & Long, S. P., Elevated concentrations of atmospheric CO_2 protect against and compensate for O_3 damage to photosynthetic tissues of field-grown wheat, 427
Meerts, P. (see Hardy, O. J.), 281
Meharg, A. (see Wright, W.), 493
Midwood, A. J. (see Proe, M. F.), 461
Miller, C. (see Seah, S.), 527
Monaco, T. A. & Briske, D. D., Does resource availability modulate shade avoidance responses to the ratio of red to far-red irradiation? An assessment of radiation quantity and soil volume, 37
Mulholland, B. J. (see McKee, I. F.), 427
Nehls, U. (see Wisser, G.), 169
Nevo, E. (see Peng, J. H.), 141
——, (see Van Rijn, C. P. E.), 471
Noctor, G. (see Foyer, C. H.), 359
Otten, W. (see Bailey, D. J.), 535
Pallaghy, C. K. (see Singh, D. K.), 249, 261
Paul, N. D. (see Hatcher, P. E.), 325
Paulsrud, P., Rikkinen, J. & Lindblad, P., Spatial patterns of photobiont diversity in some *Nostoc*-containing lichens, 291
Payn, T. (see Laing, W.), 47
Peng, J. H., Fahima, T., Röder, M. S., Li, Y. C., Grama, A. & Nevo, E., Microsatellite high-density mapping of the stripe rust resistance gene *YrH52* region on chromosome 1B and evaluation of its marker-assisted selection in the F_2 generation in wild emmer wheat, 141
Petit, D. (see Bert, V.), 225
Pollard, A. J., Gloomy predictions – modelling photoautotrophy in low-light environments, 179
Poorter, H. (see Van Rijn, C. P. E.), 471
Proe, M. F., Midwood, A. J. & Craig, J., Use of stable isotopes to quantify nitrogen, potassium and magnesium dynamics in young Scots pine (*Pinus sylvestris*), 461
Reynolds, C. S., Metal hyperaccumulation: a model system for coevolutionary studies, 182
Rikkinen, J. (see Paulsrud, P.), 291
Rock, B. N. (see Soukupová, J.), 403
Röder, M. S. (see Peng, J. H.), 141
Rolletschek, H. & Hartzendorf, T., Effects of salinity and convective rhizome ventilation on amino acid and carbohydrate patterns of *Phragmites australis* populations in the Neusiedler See region of Austria and Hungary, 95
Ruiz-Herrera, J. (see Chavez-Ontiveros, J.), 335
Sale, P. W. G. (see Singh, D. K.), 249, 261
Salerno, M. I., Gianinazzi, S. & Gianinazzi-Pearson, V., Effects on growth and comparison of root tissue colonization patterns of *Eucalyptus viminalis* by pathogenic and non-pathogenic strains of *Fusarium oxysporum*, 317
Saumitou-Laprade, P. (see Bert, V.), 225
Saxe, H. (see Bruhn, D.), 415
Schwarze, F. W. M. R. & Baum, S., Mechanisms of reaction zone penetration by decay fungi in wood of beech (*Fagus sylvatica*), 129
Seah, S., Miller, C., Sivasithamparam, K. & Lagudah, E. S., Root responses to cereal cyst nematode (*Heterodera avenae*) in hosts with different resistance genes, 527
Semenov, A. M. (see Van Bruggen, A. H. C.), 355
Seufert, G. (see Delfine, S.), 27
Silk, W. K. (see Baum, S. F.), 119
Singh, D. K., Sale, P. W. G., Pallaghy, C. K. & McKenzie, B. M., Phosphorus concentrations in the leaves of defoliated white clover affect abscisic acid formation and transpiration in drying soil, 249
——, Sale, P. W. G., Pallaghy, C. K., Singh, V., Role of proline and leaf expansion rate in the recovery of stressed white clover leaves with increased phosphorus concentration, 261
Singh, V. (see Singh, D. K.), 261
Singsaas, E. L., Terpenes and the thrermotolerance of photosynthesis, 1
Sivasithamparam, K. (see Seah, S.), 527
Soukupová, J., Cvikrová, M., Albrechtová, J., Rock, B. N. & Eder, J., Histochemical and biochemical approaches to the study of phenolic compounds and peroxidases in needles of Norway spruce (*Picea abies*), 403
Streitwolf-Engel, R. (see Mäder, P.), 155
Sun, O. (see Laing, W.), 47
Taylor, D. (see Marchant, R.), 515
Termorshuizen, A. J. (see Van Bruggen, A. H. C.), 355
Thornton, B. & Bausenwein, U., Seasonal protease activity in storage tissue of the deciduous grass *Molinia caerulea*, 75
Tognetti, R., Cherubini, P. & Innes, J. L., Comparative stem-growth rates of Mediterranean trees under background and naturally enhanced ambient CO_2 concentrations, 59
Tran, P. N. (see Baum, S. F.), 119
Tung, S. H., Ye, X. L., Zee, S. Y. & Yeung, E. C., The microtubular cytoskeleton during megasporogenesis in the Nun orchid, *Phaius tankervilliae*, 503
Van Berkel, Y. E. M. (see Van Rijn, C. P. E.), 471
Van Bruggen, A. H. C., Termorshuizen, A. J. & Semenov, A. M., Hyphal growth and colony expansion, 355
Vanderhoeven, S. (see Hardy, O. J.), 281
Van Hees, P. A. W. (see Ahonen-Jonnarth, U.), 557
Van Rijn, C. P. E., Heersche, I., Van Berkel, Y. E. M., Nevo, E., Lambers, H. & Poorter, H., Growth characteristics in *Hordeum spontaneum* populations from different habitats, 471
Verkoczy, L. K. (see Ashton, N. W.), 391
Vierheilig, H., Bennett, R., Kiddle, G., Kaldorf, M. & Ludwig-Müller, J., 146,
——, (see Mäder, P.), 155
Walsby, A. E. (see Bright, D. I.), 301
Weiler, T. (see Ashton, N. W.), 391
West, H. M. (see Hutchinson, J. J.), 453
Wiemken, A. (see Mäder, P.), 155
Wisser, G., Guttenberger, M., Hampp, R. & Nehls, U., Identification and characterization of an extracellular acid trehalase from the ectomycorrhizal fungus *Amanita muscaria*, 169
Wright, W., Fitter, A. & Meharg, A., Reproductive biomass in *Holcus lanatus* clones that differ in their phosphate uptake kinetics and mycorrhizal colonization, 493
Ye, X. L. (see Tung, S. H.), 503
Yeung, E. C. (see Tung, S. H.), 503
Young, S. D. (see Hutchinson, J. J.), 453
Zee, S. Y. (see Tung, S. H.), 503

Subject Index

Abscisic acid (ABA), 249
Accumulation, 225
Acquired characters, 483
Adaptive phenotypic plasticity, 483
Aegilops tauschii, 527
Air pollution, 403, 427
Allocation, 415
Aluminium, 557
Alyssum, 219
Amanita muscaria, 169
Arabidopsis halleri, 225
Arbuscular mycorrhiza, , 493
Arbutus unedo (strawberry tree), 59
Basidiomycete, 169
Beech (*Fagus sylvatica*), 271
Biological control, 317
Brassicaceae,
Bryophyta, 391
Bwindi-Impenetrable Forest, 515
C_4 grass, 37
Cadmium, 453
Carbon allocation, 163
Carbon dioxide, 427, 437
Carbon sequestration, 59
Cell wall, 335
Centaurea jacea complex (knapweeds), 281
Chitin synthetase mutants, 335
Chlorophyll fluorescence, 271
Chlorophylls, 403
Colonization, 317
Commentary, 1, 3, 179, 182, 353, 355
Companion cells, 107
Competition, 545
Convective flow, 95
Copper, 557
Corn smut, 335
Cyanobacteria, 291, 301
Damping off, 219
Damping-off, 317
Degradation modes, 129
Dendroecology, 59
Dicotyledons, 107
Disease resistance genes, 527
Drought, 437
Drought tolerance, 261
Dry soil, 249
Ecotype differentiation, 483
Ectomycorrhiza, 163, 557
Ectomycorrhizas, 545
Elemental defence, 211
Elevated , 163
Elevated CO_2, 415
Elongating leaf (elongation zone), 235
Embryo imprinting, 483
Epidermis, 83
Eucalyptus, 545
Eucalyptus viminalis, 317
Extracellular acid trehalase, 169
Extramatrical mycelium, 557
Extraradical hyphae, 155
Fagus sylvatica, 415
Flow cytometry, 281
Fraxinus excelsior (ash), 437
Free amino acids, 95
Free carbohydrates, 95
Fungal infection, 325
Fusarium oxysporum, 317
Gas exchange, 271
Glomus,
Glomus mosseae, 155
Glucosinolates, , 211
Gramineae, 5
Grass, 493
Growth, 47, 271
Growth rate, 119, 301
Growth response, 415
Growth responses, 545
Heavy metals, 557
Herbivory, 211, 325
Heterodera avenae (Cereal cyst nematode), 527
Heterogeneity, 535
Histochemistry, 403
Holcus lanatus, 493
Hordeum spontaneum, 471
Hordeum vulgare (barley), 527
Hybridization, 281
Hydraulic architecture, 119
Hydraulic conductivity (xylem conductivity, radial conductivity), 235
Hydrophobic membranes, 155
Hyperaccumulators, 453
Hypoxia, 95
Induced defence, 211
Inoculation, 545
Internal cycling, 461
Intraspecific variation, 471
Invasive spread, 535
Iron accumulation, 185
Isoprenoid emission, 27
Isotopic dilution, 453
^{11}K, 461
Keywords to come, 359
Lability, 453
Lake Zürich, 301
Leaf, 119
Leaf expansion rate, 261
Leaf morphology, 471
Leaf water potential, 261
Letters, 357
Lichen, 291
Liliidae, 83
Lolium, 5
Magnesium, 47
Magnoliidae, 83
Maize virulence, 335
Mapping, 141
Marker-assisted selection, 141
Maternal influence, 483
Mediterranean trees, 59
Megasporogenesis, 503
Membrane damage, 185
Membranous grass ligule, 5
Metal fixation, 453
Metal hyperaccumulation, 219
^{26}Mg, 461
Microsatellite, 141
Microtubules, 503
Modern pollen, 515
Molinia caerulea, 75
Monoterpenes, 27
Montane forest, 515
Morphological variation, 281
Mycorrhiza, 169
^{15}N, 461
^{15}N tracer, 155
NADPH oxidase, 185
Natural CO_2 springs, 59
Necrotrophs, 325
Nephroma, 291
Ni hyperaccumulation, 211
Nickel, 219
Nitrogen, 437
Nitrogen fertilization, 325
Nitrogen remobilization, 75

Nitrogen uptake, 155
Non-photochemical quenching, 47
Nostoc, 291
Nuclear envelope, 503
Nutrient remobilization, 461
Nutrient supply and uptake, 461
Nymphaeales, 83
Ontogenetic drift, 415
Orchid, 503
Osmotic adjustment, 261
Oxalid acid, 557
Ozone, 271, 427, 437
Parapatric cytotypes, 281
Pathozone, 535
Patterns, 83
Peltigera, 291
Percolation, 535
Peroxidases, 403
Phaius tankervilliae, 503
Phenolics, 403
Phosphate, 493
Phosphorus, 249, 261
Photochemical quenching, 47
Photon flux density, 37
Photooxidation, 185
Photosynthesis, 27, 47, 301, 427, 471
Phragmites australis, 95
Phylogenetic relationships, 107
Physcomitrella patens, 391
Physiological plant anatomy, 5
Phytoremediation, 453
Picea abies (Norway spruce), 403
Pinus radiata, 47
Pinus sylvestris, 163
Pinus sylvestris (Scots pine), 437, 557
Piperaceae, 83
Planktothrix rubescens, 301
Plant recovery, 261
Poaceae, 5
Polyphenols, 129
Polyploidy, 281
Population differentiation, 225
Proline, 95, 261
Protease activity, 75
Protoxylem, 119
Protoxylem-metaxylem transition, 235
Pythium, 219
Querca petraea (oak), 437
Quercus ilex (holm oak), 59
Quercus suber, 27
Radiation quality, 37
Ramet initiation, 37
Reaction zones, 129
Red:far-red ratio, 37
Relative growth rate, 415, 471
Replicating extrachromosomal transgenic element, 391
Reproduction, 493
Respiration, 471
Rhizoctonia solani, 535
Root cellular response, 527
Root meristems, 83
Rubisco, 427
Rust fungi, 325
Salinity, 95, 119
Schizachyrium scoparium (little bluestem), 37
Scots pine, 163, 461
Seasonal shoot growth, 75
Secondary phloem, 107
Secretion, 5
Seed mass, 471
Selective delignification, 129
Serpentine, 211
Shade avoidance response, 37
Soft-rot, 129
Sorghum bicolor (sorghum), 119
Stable isotopes, 461
Statistical analysis, 515
Stomata, 271
Streptanthus, 211
Stress tolerance, 185
Stripe rust resistance gene, 141
Sugars, 95
Superoxide dismutase, 185
Superoxide radical, 185
Symbioses, 291
Syncytium, 527
Systemic acquired resistance, 325
Tall fescue (*Festuca arundinacea*), 235
Temperature, 415
Tetrasomic inheritance, 281
Thermotolerance, 27
Thlaspi caerulescens, 453
Tolerance, 225
Toxicity, 557
Transformation, 391
Transpiration rate, 249
Transport law, 119
Tree damage, 403
Tree growth, 437
Tree rings, 59
Trehalose, 169
Trichoblasts, 83
Tripartite interactions, 325
Triticum aestivum, 427
Triticum aestivum (wheat), 527
Triticum dicoccoides, 141
$tRNA^{Leu}$intron, 291
Tropaeolum majus,
Uganda, 515
Variance components, 471
Vesicular–arbuscular mycorrhizas, 545
Water stress, 59
Water transport, 235
Water use, 119
Water use efficiency (WUE), 249
Wheat, 427
White clover, 261
White clover (*Trifolium repens*), 249
Wild emmer wheat, 141
Xylem maturation, 235
Xylem microcasting, 235
Zinc, 185, 225